IN THE CLAIMS:

1-13.   (Cancelled)

Claim 14 has been amended as follows:

5   14.   (Currently amended)   An apparatus for analyzing cardiac events, comprising:

a feature extraction unit, supplied with an electrocardiogram, said feature extraction unit deriving features of cardiac events from said electrocardiogram and determining a feature vector, by a

10   wavelet transform operating on said electrogram, describing waveform characteristics of cardiac events in said electrogram; and

a clustering unit provided with said feature vector, said clustering unit determining a distance between said feature vector and

15   corresponding cluster feature vectors and assigning a cardiac event in said electrogram to a particular cluster that results in a minimum distance, as long as said minimum distance is less than a predetermined threshold value, and generating an output signal that identifies the particular cluster to which the cardiac

20   event has been assigned.

Claim 15 has been amended as follows:

15.   (Currently amended)   An apparatus as claimed in claim 14 wherein each of said clusters is defined by a cluster center μ_i and a co-variance matrix Σ_i for the cluster features of that cluster, and wherein said

25   clustering unit determines a distance function D_i^2 between each event feature vector and said cluster center μ_i.

16.   (Previously presented)   An apparatus as claimed in claim 15 wherein said clustering unit calculates said distance using Mahalanobis distance criterion.

30   17.   (Previously presented)   An apparatus as claimed in claim 15 wherein said clustering unit determines said minimum distance by a grid search over a duration of the cardiac event.

18. (Previously presented) An apparatus as claimed in claim 14 comprising an integrator that integrates said distance over a predetermined period of time.

19. (Previously presented) An apparatus as claimed in claim 14 wherein said clustering unit updates said cluster feature according to a predetermined rule dependent on said minimum distance.

20. (Previously presented) An apparatus as claimed in claim 14 wherein said clustering unit generates a new cluster if said minimum distance exceeds said predetermined threshold value, by setting features for said new cluster equal to the event features of the cardiac event that resulted in said minimum distance exceeding said predetermined threshold value.

21. (Previously presented) An apparatus as claimed in claim 14 wherein said clustering unit terminates clusters that fail to have a predetermined number of cardiac events grouped therein within a predetermined time period.

22. (Previously presented) An apparatus as claimed in claim 14 wherein said clustering unit performs a likelihood-based search sequence over said clusters to determine said minimum distance.

23. (Previously presented) An apparatus as claimed in claim 14 wherein said clustering unit determines said minimum distance by a grid search only over clusters in which cardiac events have been grouped within a duration of the cardiac event.

24. (Previously presented) An apparatus as claimed in claim 14 wherein said clustering unit calculates a distance of a cardiac event in question from a cluster in which a cardiac event was previously grouped.

25. (Previously presented) An apparatus as claimed in claim 14 comprising a classifier that associates said clusters respectively with different cardiac rhythms according to predetermined rules.

Claim 26 has been amended as follows:

26. (Currently amended) A heart stimulator comprising:

a pulse generator ~~adapted~~ configured to interact with a subject to deliver stimulation pulses to the subject;

an apparatus ~~for analyzing~~ that analyzes cardiac events comprising a feature extraction unit, supplied with an electrocardiogram, said feature extraction unit deriving features of cardiac events from said electrocardiogram and determining a feature vector, by a wavelet transform operating on said electrogram, describing waveform characteristics of cardiac events in said electrogram, and a clustering unit provided with said feature vector, said clustering unit determining a distance between said feature vector and corresponding cluster feature vectors and assigning a cardiac event in said electrogram to a particular cluster that results in a minimum distance, as long as said minimum distance is less than a predetermined threshold value; and

an arrhythmia detection and control unit connected to said pulse generator ~~for controlling~~ that controls emission of stimulation pulses from said pulse generator dependent on detection of an arrhythmia dependent on the cluster in which the cardiac event is grouped.